Course Analysis DD2528 Dependable Autonomous Systems HT 2023

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DESCRIPTION OF THE COURSE EVALUATION PROCESS

Describe the course evaluation process. Describe how all students have been given the possibility to give their opinions on the course. Describe how aspects regarding gender, and disabled students are investigated.

1)Evaluation is based on learning evaluation questionnaire (LEQ). The course was completed by 32 students. LEQ was answered by 6. The feedback on the course content was obtained during the last presentation session.

2). Each assignment included a presentation session during which each student group presented the solution and discussed what was the most challenging, was the assignment clearly defined and was the time spend on working on the assignment matching the expected work load. The students could ask the questions and clarify issues during the lab sessions.

3)The course had six female participants. I have addressed the gender issue by making sure that they are always given opportunity to express their opinion. Based on this, I can conclude that the evaluation of the female participant is at the same level as male course participant. I believe this is because they worked in the groups and shared the same experience with the male students.

4) Students with disability were given extra time to finish the quiz.

DESCRIPTION OF MEETINGS WITH STUDENTS

Describe which meetings that has been arranged with students during the course and after its completion. (The outcomes of these meetings should be reported under 7, below.)

1). The course included eight in-class lectures, six lab support sessions and four presentation sessions.
2)Each assignment included the presentation of the work by each group and teacher-student discussion. Overall, four sessions were arranged for each group to discuss the assignment and provide feedback. It allowed me to immediately incorporate the feedback and add some clarifications based on the student's comments.

COURSE DESIGN

Briefly describe the course design (learning activities, examinations) and any changes that have been implemented since the last course offering.

DD2528 is project based course. The students get 6 ECTS for lab work and 1.5 ECTS for quiz.

The course has eight lectures that give the key knowledge needed to complete it. In addition, on-line material such as videos, examples of problem solutions and reading material was provided. The practical learning happens in the labs, where students complete a design of a large autonomous system as four mini-projects (lab assignments) focusing on the specific aspects corresponding to the learning objectives. Each lab assignment included modelling part, implementation (programming), report and presentation. During the lab the students had an opportunity to ask questions, receive additional explanation or clarification. The dedicated zoom meetings with each group were arranged before the submission of the report to present the solution and receive the feedback, which can be incorporated in the final version of the report.

The theoretical aspects of the course were mastered via Canvas quiz. The students had a test quiz, examples of solutions and dedicated videos and or reading to prepare to the exam.

The main changes in the course for 2023 were:

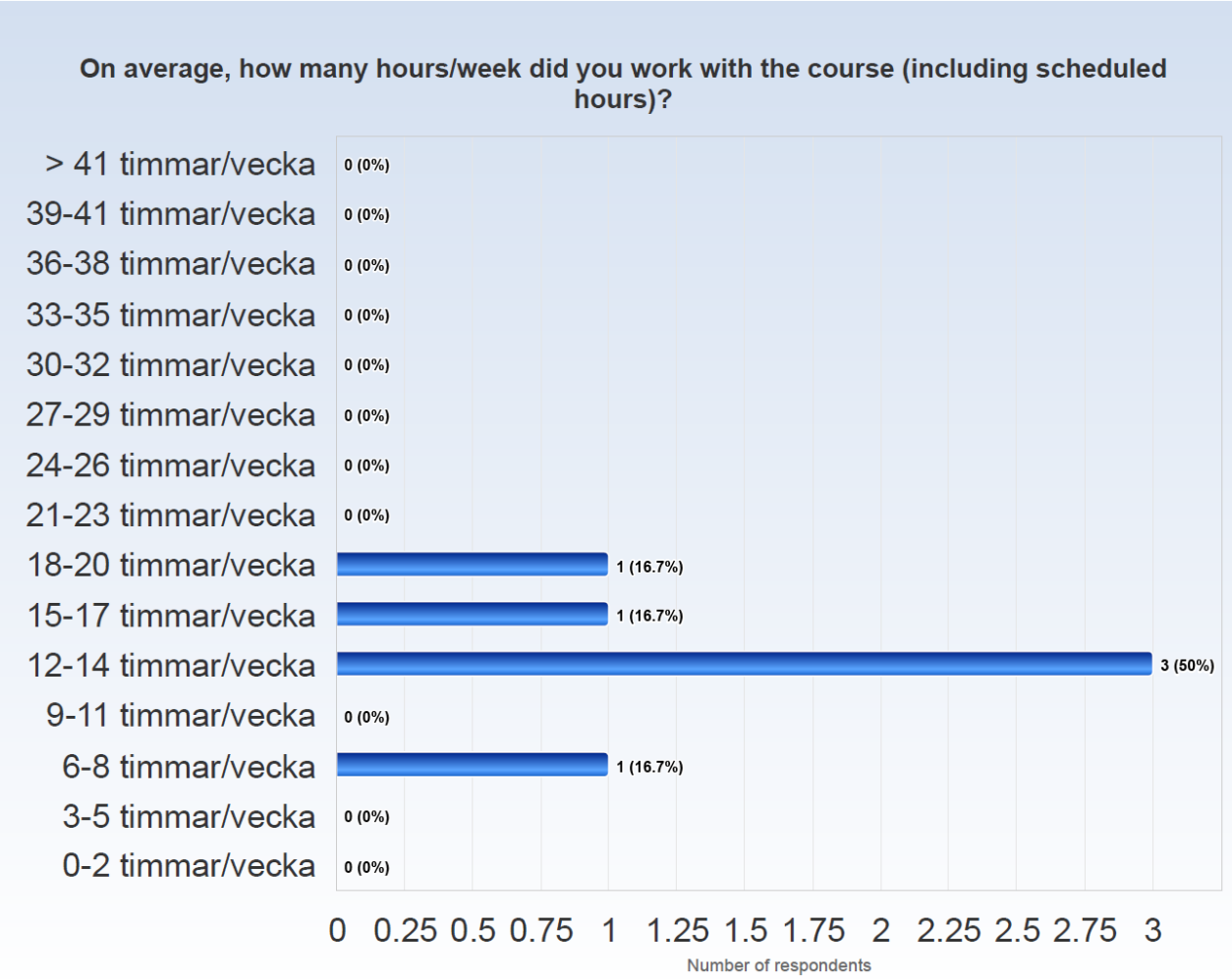
* The course strengthen active learning. In addition to self-study materials (videos and text, e.g, articles, examples of

problem solving and slides), each lecture contained at least one mini-challenge – a small task to be solved in 5 minutes in small groups followed by a general class discussion. Such mini-challenges were offered right after the students got acquainted with certain concepts of methods, which proved to be hard to grasp based on the experience from the previous course releases.

* Suggestions on the material to refresh background knowledge as well as get a deeper insight into the topic were updated.
* One assignments was redesigned because students found it unclear in the previous release of the course. The students praised the idea of assignments that are defined as the parts of a large project allowing then to work on different aspects of the same system in all assignment. It was a very good solution because the students developed the modules of one large system and got coherent view on how dependability aspects are interrelated in large autonomous systems design.
* The grading criteria were redefined in more detailed and transparent way. Moreover, they were made proportional to the size of the group. As a result, the students could better plan their time and efforts as well as set different goals for the grades.
* New questions for canvas quiz were defined. The quiz verifies mastery of theoretical aspects.

THE STUDENTS' WORKLOAD

Does the students' workload correspond to the expected level (40 hours/1.5 credits)? If these is a significant deviation from the expected, what can be the reason?



The desired course load is 20 hours per week. The students could control their work load based on the level of ambition: higher grades required more efforts. Some students aimed at the lowest passing grade from the beginning, so they had to solve only the basic problems.

Comments:

Comments (I worked: 6-8 timmar/vecka)
It isn't the most time-intensive course, but the content is very interesting, so I recommend the course to anyone interested in the subject.

Comments (I worked: 12-14 timmar/vecka)
The workload of the course was well planned and reasonable. Depending on what grade you wanted it was easy to adapt your workload.
There were 4 hours every week for classroom activities (lecture + lab). For the assignments, I spent significant time to complete it, especially aiming for higher grades.

Comments (I worked: 15-17 timmar/vecka)
The course required quite a few hours per week with some assignments requiring a bit less, but I would say that around 15-17 would be close to the average.

Comments (I worked: 18-20 timmar/vecka)
Attending lectures and working on assignments.

THE STUDENTS' RESULTS

How well have the students succeeded on the course? If there are significant differences compared to previous course offerings, what can be the reason?

1). The students managed well. The grade distribution follows the normal distribution curve. The course contains many design tasks, which students liked. It kept them motivated and ambitious throughout the whole course. Some students had consistently low ambition and performed correspondingly.
The Canvas quiz worked well for all students. An additional lecture is required for reliability modelling.
There are no significant differences but given the fact that the course has attracted more students and the retention rate is almost 100%, I believe this course offering was successful.

Comments (My response was: Ja)
Clear instructions and help sessions to get started with assignments are very helpful to me and this course provided that.

STUDENTS´ANSWERS TO OPEN QUESTIONS

What does students say in response to the open questions?

Overall, the feedback is positive.

What was the best aspect of the course?

What was the best aspect of the course? (I worked: 6-8 timmar/vecka)
Very interesting subject, and good teaching

What was the best aspect of the course? (I worked: 12-14 timmar/vecka)
The "review" meetings before each assignment were a good idea and well implemented. The assignments themselves were also well structured with clear goals and directions which was much appreciated.
The group assignments. It helps me to collaborate with fellow students, and the assignments are challenging.

What was the best aspect of the course? (I worked: 15-17 timmar/vecka)
The best part of the course was that it could be done almost fully remotely. The lecture slides were quickly available and the work was easy to schedule with the group when being only three.

What was the best aspect of the course? (I worked: 18-20 timmar/vecka)
The assignments were both fun and challenging.

OVERALL IMPRESSION

Summarize the teachers' overall impressions of the course offering in relation to students' results and their evaluation of the course, as well as in relation to the changes implemented since last course offering.

The changes were definitely positive. The assignments allow the students to build a more holistic picture to learn the system context. The quiz also helped them to complement their hands-on experience with modelling and designing autonomous system with the theoretical concepts and better understand their role in design of autonomous systems. The idea to propose a concrete example of an autonomous system and ask students to reflect on its sustainability, ethical and societal issues was sound. It would be also useful to complement it with a face-to-face in class discussion. Overall, the students enjoyed working with a large, i.e., close to realistic system and address different aspects of its design via corresponding assignments.

ANALYSIS

Is it possible to identify stronger and weaker areas in the learning environment based on the information you have gathered during the evaluation and analysis process? What can the reason for these be? Are there significant difference in experience between:
- students identifying as female and male?
- international and national students?
- students with or without disabilities?

There are not enough submitted questionnaires to make statistically valid conclusions but all the students appreciated availability of video recording, sufficient amount of material in different forms. For international students an additional positive moment was that they could travel home earlier before Christmas and still participate in the course also because course materials were accessible on Canvas. Acknowledging that many students in my courses are international students and non-native speakers of English, my courses integrate several additional layers of support to students by offering them access to recorded lectures which the students can review at their own pace. In addition, I have encouraged my students to bring about their unique perspectives and experiences in the discussion about sustainability, environmental protection and ethical industrial practices.

What would you suggest to improve?

What would you suggest to improve? (I worked: 6-8 timmar/vecka)
Perhaps one more lesson, it felt a bit tight on schedule in the last lessons.

What would you suggest to improve? (I worked: 12-14 timmar/vecka)
The demo part of the assignments could have been better. If there is a simulation to test the code we made, and the simulation could give inputs to the code and the output from our code runs the simulation. A setup like this definitely increase the excitement for the learning. Also some lectures are long, and too many slides.

What would you suggest to improve? (I worked: 15-17 timmar/vecka)
The assignments which solely consisted of group work were quite sequential which made it almost impossible to divide between the group members. It worked very well with my group but with more than three people I can see that the efficiency would be quite low when five people are tackling the same problem at the same time which was the recommended group size. I would suggest recommending smaller groups to the students and potentially adjusting the assignments for this if needed. The assignments could sometimes be described quite vaguely which made us produce more than necessary, clearly stating what is expected on more of the questions would be a great addition.

What advice would you like to give to future participants?

What advice would you like to give to future participants? (I worked: 6-8 timmar/vecka)
Take this course if you like the subject, you won't regret it.

What advice would you like to give to future participants? (I worked: 12-14 timmar/vecka)
The lectures were useful with examples and small preparative tasks so make sure you go to them and make use of the assigned Q&A times.

What advice would you like to give to future participants? (I worked: 15-17 timmar/vecka)
Working continuously and emailing whenever you are uncertain of what the assignment is asking for.

What advice would you like to give to future participants? (I worked: 18-20 timmar/vecka)
Read the assignment descriptions early to form an idea of how to solve it in your head before you start.

Is there anything else you would like to add?

Is there anything else you would like to add? (I worked: 12-14 timmar/vecka)
I liked the small discussions and exercise in between the lecture. That's how I met my teammates in the first lecture. It encouraged small talk between the students, and I really find it hard to do it by myself.

Is there anything else you would like to add? (I worked: 15-17 timmar/vecka)
The course was great, thank you!

PRIORITIZED COURSE DEVELOPMENT

What aspects of the course should be developed primarily? How can these aspects be developed in short and long term?

Based on the students comments the following changes will be made:
Two lectures will be added to cover in depth theoretical aspects and allow in class discussion of sustainability, ethics and societal impact of autonomous systems.
A more systematic learning material will be offered based on the outcomes of my external research collaboration, so the students would have more systematic reading material and opportunities to explore the topics beyond the ones which are covered in the course.
Instructions for the assignments will include a guidance on a workflow to enable more asynchronous work within the group.
For the first assignment, a simulator will be offered.
More example of applications of the learned techniques will be added to help the students to understand the requirement for solving the assignment.